

Course Specifications

From the academic year 2018-2019 up to and including the

Neurosciences in language and speech (D012272)

Course size (nominal values; actual values may depend on programme)

Credits	3.0	Study time	90 h	Contact hrs	30.0 h
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Course offerings and teaching methods in academic year 2018-2019

A (semester 1)	Dutch	lecture	30.0 h
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Lecturers in academic year 2018-2019

Santens, Patrick	GE01	lecturer-in-charge
De Letter, Miet	GE27	co-lecturer

Offered in the following programmes in 2018-2019

	crdts	offering
Master of Science in Speech Language and Hearing Sciences (main subject Logopaedics)	3	A

Teaching languages

Dutch

Keywords

Language, speech, brain lesion, neurophysiology, diagnostics, treatment, measurement

Position of the course

This course elaborates on neurogenic speech and language disorders. The ultimate aim is to integrate fundamental and clinical knowledge in a diagnostic and therapeutic plan for patients with neurogenic speech and language disorders.

Contents

1. Cerebral neural networks : neurophysiology and neuropharmacology in relation to behaviour and cognition
2. Neurophysiology and neuro-imaging in fundamental and clinical research of speech and language disorders. Electro- and magneto-encephalography allow to measure task-related changes in electrical activity of the brain. Functional imaging (PET, SPECT, fMRI) estimate changes in local perfusion. Other techniques such as DTI and rTMS contribute to the knowledge of spatial and temporal organisation of speech and language.
3. The neurophysiological organization of the auditory and associated cortex. An introductory chapter on auditory speech perception according to the trace model is the basis for gaining insight in the auditory processing of humans and non-human primates. This is the basis for the speech perception model developed by Hickok and Poeppel as a background for diagnosing aphasia and dysarthria.
4. The neurophysiological organization of the visual and associated cortex. Reading and writing are determined both culturally and biologically. The neurophysiological basis for visual processing of graphical characters to letters, syllables and word meaning is illustrated. Models of visual word recognition and production are used to illustrate orthographic problems in people with aphasia.
5. Integration of neuro-anatomical, neurophysiological and clinical knowledge in the organization of semantics.
The interhemispheric organization of semantics is based on sensorimotor properties. These are discussed in the context of attribute- and category-specific models. Neuro-anatomical and neurophysiological correlations are demonstrated and applied in the diagnosis and therapy of semantic problems.
6. Integration of neuro-anatomical, neurophysiological and clinical aspects in the organization of grammatics.
Studies on syntactic processing at a sentence level indicate involvement of inferior frontal cortex and anterior temporal cortex. The role of memory processes and grammatical complexity is important in the differentiation of grammatical problems in aphasia. This chapter elaborates on diagnostic and therapeutic implications.

7. Integration of neuro-anatomical and neurophysiological organisation of speech. Following a review of recent evolutions in the knowledge of speech organization, the clinical features of the dysarthria types are approached from a neurophysiological background. Based on this the principles of diagnosis and treatment of dysarthria are elaborated.

8. Subcortical influence on speech and language.

The role of non-cortical structures in the organization of speech and language is often underestimated. Brain stem structures, the cerebellum, basal ganglia, thalamus and white matter are discussed and their role is illustrated by a number of clinical syndromes.

9. Clinical applications

Initial competences

It is recommendable to have followed the courses on "Basics of logopaedics", "Neuroanatomy of the central nervous system", "Clinical Neurology" and "Neurogenic speech and language disorders" of the academic bachelor

Final competences

1. Integration of clinical and instrumental analysis of neurogenic speech and language disorders
2. Integration of neurogenic speech and language disorders in a platform of fundamental neuroscience.
3. Organization of a treatment plan based on knowledge of underlying mechanisms
4. Develop speech and language rehabilitation as an element of multidisciplinary rehabilitation

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

Access to this course unit via an exam contract is unrestricted

Teaching methods

Lecture

Extra information on the teaching methods

Lectures are illustrated with multiple clinical cases, presented as plenary exercises.

Learning materials and price

- Slides and additional material distributed on Minerva platform

References

Scientific publications are indicated with individual chapters.

Course content-related study coaching

Appointments made by e-mail

Evaluation methods

end-of-term evaluation

Examination methods in case of periodic evaluation during the first examination period

Written examination with open questions, written examination with multiple choice questions

Examination methods in case of periodic evaluation during the second examination period

Written examination with open questions, written examination with multiple choice questions

Examination methods in case of permanent evaluation

Possibilities of retake in case of permanent evaluation

not applicable

Extra information on the examination methods

1. Open questions on theoretical aspects and on clinical cases, probably presented by video during the examination. 2. Multiple choice questions

Calculation of the examination mark

Sum of scores